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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

WHALEN, DANIEL B

ART UNIT

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2829

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/562,685	Applicant(s) VAL ET AL.	
	Examiner DANIEL WHALEN	Art Unit 2829	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 April 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-8,12 and 13 is/are rejected.
- 7) ☒ Claim(s) 2 and 9-11 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This is an office action in response to the amended claims filed on 04/08/2009.
Currently, claims 1-13 are pending.

Claim Objections

2. Claims 1-13 are objected to because of the following informalities: Re Claim 1, the recitation "A method for the interconnection" in line 1 should be read -- A method for fabricating an interconnection --. Also, "," at the end of each sentence in lines 4, 5, 6, 9, 12 should be changed to -- ; --. In line 10, "and/or" should be read -- and -- in order to clarify the claim language. Lastly, In line 12, -- and -- should be inserted after "heterogeneous structure;". Similar correction is required to claim 11. Claims 2-10 and 12-13, which depend from either claim 1 or claim 11, are objected.

Furthermore, in claim 8, " the_passive " in line 1 should be read -- the passive --.
In claim 13, "A method for the three-dimensional" should be read -- A method for fabricating a three-dimensional --.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
4. **Claim 7** is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant

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regards as the invention. The recitation of "a prior step of thinning the passive components" renders claim indefinite since it is unclear as to what "a prior step" applicant is referring to.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. **Claims 1, 3, 4, and 6-7** are rejected under 35 U.S.C. 103(a) as being unpatentable over Fillion et al. (US 5,497,033; hereinafter "Fillion") in view of Nakatani et al. (US 7,134,198; hereinafter "Nakatani").

7. **Re Claim 1**, Fillion teaches a method for the interconnection of active components and passive components provided with terminals for their interconnection, comprising the steps of:

positioning and fixing the active (item 20) and passive (item 14) components on a flat support (item 10), the terminals (item 15) being in contact with the support (fig. 1a; col. 4, line 59—col. 5, line 11);

depositing a polymer layer (item 24) on all of the support and the components (fig. 1.b; col. 5, line 48- col. 6, line 3);

removing the support (fig. 1c & 2c; col. 6, line 30-41);

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redistributing the terminals between the components and/or toward the periphery by means of metal conductors (item 32) arranged in a predetermined layout, to obtain a reconstituted heterogeneous structure (fig. 1.d-e; col. 8, line 7-27); and

thinning the structure the polymer layer and at least one passive component by nonselective surface treatment (fig. 1.a-e and fig. 8.a-b; col. 12, line 29-63).

However, Fillion does not explicitly disclose a step of rectifying and pre-thinning the polymer layer prior to the step of redistributing the terminals, to calibrate the thickness of the layer to a predetermined value and render the surface of said layer substantially flat and parallel to the support. Nakatani teaches a step of rectifying and pre-thinning the polymer layer prior to the step of redistributing the terminals (see fig. 2D-2F, fig. 4A-4C, and fig. 6A-6C) so as to obtain the desired thickness without being contaminated by abrasives and water entering during the abrading (col. 21, lines 19-27). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teaching of Fillion with that of Nakatani so as to obtain the desired thickness without being contaminated by abrasives and water entering during the abrading.

It is noted that the recitation of "to calibrate the thickness of the layer to a predetermined value" is only a statement of the inherent properties of "a step of rectifying and pre-thinning the polymer layer". The process recited in Nakatani is substantially identical to that of the claims, claimed properties or functions are presumed to be inherent. Or where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or

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substantially identical processes, a *prima facie* case of either anticipation or obviousness has been established. *In re Best*, 195 USPQ 430, 433 (CCPA 1977) and MPEP 2112.01.

Re Claim 3, Nakatani teaches wherein said rectifying and pre-thinning step comprises thinning the layer by nonselective surface treatment of the polymer layer and the passive component (fig. 2E).

Re Claim 4, Fillion teaches that the surface treatment is carried out by nonselectively lapping and polishing (mechanical grinding) the polymer layer and the components (fig. 8.a-b; col. 12, line 29-63).

Re Claim 6, Fillion teaches that said redistributing of the terminals step comprises depositing a photo-etchable insulating layer (item 29), etching said layer in a pattern corresponding to the positioning of the terminals, depositing a metal layer (item 32) and etching said metal layer according to the predetermined layout of the metal conductors (fig. 1.e; col. 8, line 13-28).

Re Claim 7, Fillion teaches comprising a prior step of thinning the passive components (fig. 8.a-b; col. 12, line 29-53).

8. **Claims 5 and 12** are rejected under 35 U.S.C. 103(a) as being unpatentable over Fillion and Nakatani as applied to claim 1 above, and further in view of Nakamura et al. (US Pub 2002/0151103 A1; hereinafter "Nakamura").

9. **Re Claim 5**, the combined teaching of Fillion and Nakatani has been discussed above. Furthermore, Fillion teaches that the support includes an adhesive film (item

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12a) and the removal step (fig. 2.a-b; col. 8, line 29-46). However, Fillion does not explicitly disclose the details of removal step. Nakamura discloses that the removal is carried out by peeling the film (page 7, paragraph 141). Therefore, it would have been obvious to one of the ordinary skill in the art at the time of the invention to combine the teaching of Fillion and Nakatani with that of Nakamura as it is common technique for removing the adhesive material.

Re Claim 12, the combined teaching of Fillion and Nakatani in view of Nakamura teaches the active and passive components being arranged on the support in order to form a set of identical patterns, furthermore comprising cutting (item 16, dicing from fig. 12 of Nakamura) the thinned heterogeneous structure around said patterns, to obtain a corresponding number of identical thinned heterogeneous elementary components (fig. 11-12 and fig. 14a-b). It is known to one of the ordinary skill in the art that for integrated circuit module fabrication, a set of identical components (dies) are produced and diced to obtain a corresponding number of identical components.

10. **Claim 13** is rejected under 35 U.S.C. 103(a) as being unpatentable over Fillion Nakatani, and Nakamura as applied to claim 12 above, and further in view of Admitted Prior Art (Fig. 5; page 11, line 35 - page 12, line 5).

11. **Re Claim 13**, teaching of Fillion, Nakatani, and Nakamura has been discussed above, However, the combined teaching does not explicitly disclose a method for the three-dimensional interconnection of active and passive components provided with terminals for their interconnection, comprising the steps of: producing thinned

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heterogeneous elementary components by the method as claimed in claim 12, the terminals being redistributed in particular toward the periphery, stacking and bonding the heterogeneous components, coating the stack with the aid of a polymer material, cutting the material to form, around said stack, a parallelepipedal block whose faces will expose the peripheral contacts of the active and passive components, depositing a metallization layer on at least a part of the faces, forming an interconnection network of the conductors by laser etching the metallization layer on the faces of the block.

Admitted Prior Art (APA) teaches disclose a method for the three-dimensional interconnection of active and passive components provided with terminals for their interconnection, comprising the steps of: producing thinned heterogeneous elementary components by the method as claimed in claim 12, the terminals being redistributed in particular toward the periphery, stacking and bonding the heterogeneous components, coating the stack with the aid of a polymer material, cutting the material to form, around said stack, a parallelepipedal block whose faces will expose the peripheral contacts of the active and passive components, depositing a metallization layer on at least a part of the faces, forming an interconnection network of the conductors by laser etching the metallization layer on the faces of the block. Therefore, it would be obvious to one of ordinary skill in the art at the time of the invention to combine the teaching of Fillion, Nakatani, and Nakamura with that of APA so as to form three-dimensional heterogeneous interconnection.

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12. **Claim 8** is rejected under 35 U.S.C. 103(a) as being unpatentable over Fillion and Nakatani as applied to claim 7 above, and further in view of Hirano et al. (US Pub 2003/0222335 A1; hereinafter "Hirano").

13. **Re Claim 8**, the combined teaching of Fillion and Nakatani has been discussed above. Furthermore, Fillion discloses that the passive component can be capacitor (col. 5, line 12-27). However, the combined teaching does not explicitly disclose that the passive component is a ceramic capacitor with a zone of even and odd interdigitated electrodes, two ceramic filling zones on either side of the electrode zone and two lateral end terminals to which the even and odd electrodes are respectively connected, the prior thinning step consists in thinning one of said ceramic zones in a plane parallel to the electrodes. Hirano discloses that the passive component is a ceramic capacitor with a zone of even and odd interdigitated electrodes (item 19), two ceramic filling zones (item 14) on either side of the electrode zone and two lateral end terminals (item 12) to which the even and odd electrodes are respectively connected, the prior thinning step consists in thinning one of said ceramic zones in a plane parallel to the electrodes (fig. 3A-3E; page 8, paragraph 87-94). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teaching of Fillion and Nakatani with that of Hirano so as to improve the mounting characteristics.

Allowable Subject Matter

14. **Claims 9-10** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten to overcome the claim objection(s) and if rewritten in

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independent form including all of the limitations of the base claim and any intervening claims.

15. **Claim 11** would be allowable if rewritten to overcome the claim objection(s) as set forth in this Office action. Claim 2, which depend from claim 11, would be allowable.

Response to Arguments

16. Applicant's amendments to the claims, particularly claim 1, filed 04/08/2009, have been fully considered and persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made as set forth above in the office action.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DANIEL WHALEN whose telephone number is (571)270-3418. The examiner can normally be reached on Monday-Friday, 7:30am to 5:00pm, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ha Nguyen can be reached on (571) 272-1678. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/D. W./
Examiner, Art Unit 2829
06/05/2009

Daniel Whalen
/Michael S. Lebentritt/

Primary Examiner, Art Unit 2829